

2.0 EXECUTIVE SUMMARY

The National Spatial Data Infrastructure (NSDI) has not attracted the level of private sector participation expected when the program was established in 1994. To begin to address this problem the Spatial Technologies Industry Association was awarded a Grant to examine ways to increase private sector participation in the NSDI. This project begins to examine ways to address this issue as well as identifying obstacles – perceived and real – that have limited the private sector from participating in the NSDI.

The Federal Geographic Data Committee (FGDC) in 1994 was tasked Presidential Executive Order with championing the development of the National Spatial Data Infrastructure (NSDI), an effort at the Federal level to improve utilization of geospatial data. This undertaking envisioned participation and cooperation with state, local, tribal government, and the private sector.

Since the program's inception, activities have been undertaken by the FGDC to accomplish the goals for the NSDI including:

- building a National framework of data,
- addressing standards issues including metadata,
- creating a National Geospatial Data Clearinghouse linking data producers with data users,
- providing funding to local communities to develop framework data, and
- soliciting private sector participation in NSDI activities, including the GeoData Forums.

This Section Addresses

- Objectives of the Phase I Report
- Explains technology drivers
- Product not process is important to the private sector
- NSDI must articulate value proposition to private sector
- **Summary of Findings and Recommendations**

Since 1994, the spatial technologies industry “private sector” has grown significantly addressing market defined needs, addressing interoperability issues, expanding into new, growth areas, including location-based services and enhanced E(mergency) 9-1-1 services. This industry sector has grown at a compound annual growth rate of approximately 20% since the mid-1990's.

From the federal perspective, however, participation by the private sector in the FGDC's NSDI effort has not met expectations.

This project and the Phase I Report is intended to examine ways to increase private sector awareness of the NSDI and to build participation in the NSDI effort. Further, the project is intended to examine ways to expand knowledge of the NSDI in the private sector and to develop methodologies to identify private sector advocates of the NSDI.

The project also identifies industry drivers (key factors) that can help expand usage of the NSDI throughout the user community.

As we explored the Federal government's expectations for the NSDI through authorizing circulars and orders and discussed the NSDI with influential companies that make up the spatial technologies industry, we became aware of a broad-based reluctance on the part of private sector companies to participate in the NSDI. Before we could effectively begin to increase private sector participation in the NSDI we felt it essential to identify private sector concerns to more broad-based private sector involvement in the NSDI.

Some of the concerns of getting to an NSDI were recognized by the National Academy of Public Administration (NAPA) in its 1998 report, namely that the challenges of getting to a National Spatial Data Infrastructure (NSDI) were "daunting, complex, and time-consuming."

This recognition is in part due to the Federal government's jurisdictional issues – "neither FGDC nor any other central office or coordinating body can require any two or more agencies to work together, much less to consolidate any of their GI functions."

In addition to federal jurisdictional issues, private sector data suppliers and users expressed skepticism on their part toward NSDI concepts. The NAPA study stated, "Most data suppliers and data users are skeptical of NSDI concepts or they do not see sufficient benefit to modifying their own practices for collecting and maintaining data, particularly if it is more costly to implement a federally endorsed standard."

Notwithstanding identified obstacles, the FGDC has championed this effort.

The NSDI, under the auspices of the FGDC, holds out the promise, through its policies, standards, and activities, to establish more comprehensive, integrated, and available geospatial data than has ever existed.

The NSDI is a national resource capable of contributing to the Nation's economic activity well beyond what the NSDI framers' envisioned. The market for location-based services is emerging as a growth market. Other drivers of spatial technologies include:

- the requirement for all wireless phones to be capable of providing a location reference on wireless phone callers within 75 meters, 70 percent of the time on E-911 calls by the year 2001 is driving demand for accurate spatial infrastructure. To meet this FCC requirement and comply with the FCC's E911 Phase II mandate that requires all wireless carriers to be able to pinpoint a caller's location for emergency purposes, the spatial technologies, telecommunications, and emerging wireless technology companies are developing business models and products that are geodata-dependent.
- the integration of GIS, GPS, remote sensing, and agricultural decision support applications technologies has created a whole new industry called "precision agriculture", and
- the convergence of these technologies and the growth in demand is resulting in dramatically lower cost systems increasing demand still further.

The private sector is an important stakeholder in this national initiative. It is both an important contributor (the private sector performs most of the production work for NSDI Framework) as well as a significant beneficiary (value added services are being offered by the private sector that utilize public domain spatial data extensively).

For the NSDI to realize its potential it must recognize how the private sector spatial technologies markets function for the NSDI to attract private sector support and participation. For this national program to be responsive to the nation's needs, the public and private sector interests must be fully recognized and understood by the private sector firms that make up the spatial technologies industry.

This report:

- Reviews the authorities establishing the NSDI Initiative and the assumptions made at the outset by the public sector with respect to private sector participation in the NSDI;
- Examines and validates the low private sector participation in the NSDI to date and suggests reasons for the lack of private sector involvement;
- Identifies private sector drivers (motivators) to participation in the NSDI;
- Summarizes impediments to achieving the goal of the NSDI; and
- Offers subsequent activities to address the findings in this first phase report and to develop processes and programs supporting private sector growth in participation in the NSDI.

2.1 Technology Drivers

Information technology is the engine that is driving the United States' economy. Computing performance has increased exponentially, while the cost of computing technology has declined steadily. Moore's law, named after Intel Corporation's chairman Gordon Moore predicted that the performance levels of computers would double approximately every eighteen months resulting in dramatic declines in the cost of computing power.

The Internet has evolved from a network linking the country's national laboratories' supercomputers to a global data backbone supporting new commercial business models capable of increasing business opportunities, while significantly reducing transaction costs in nearly every business sector.

Commercial software applications are proliferating, putting information technology productivity into everyone's hands; empowering even those who are incapable of writing computer code.

In the past few years, the GIS software industry has segmented into two markets; the computer "power/professional user" and the mass-market or "casual/occasional user." As Geoffrey Moore – no relation to Gordon Moore - professes, "One of the keys to success is to relentlessly simplify the whole product in order to make it more suited to general-purpose use and easier and less costly to deploy and maintain." This is beginning to happen in the spatial technologies sector and can ultimately lead to much broader market penetration.

The information and telecommunications sectors now account for approximately 20% of the Nation's gross domestic product and drive another 40% of the nation's economy. According to the National Academy of Public Administration's (NAPA) 1998 study "Geographic Information for the 21st Century," geographic information is associated with national economic activity estimated at some \$3.5 trillion in 1997 or nearly 50% of the Nation's \$8.3 trillion gross domestic product. The NAPA Report identified 11 economic purposes; from property and voting rights to national defense that have geodata dependencies.

The evolution of satellite navigation systems developed and deployed for national defense have been made available for civilian purposes. Remote sensing technologies, long the domain of the U.S. defense intelligence community, have been developed for commercial purposes since the passage of the Land Remote Sensing Policy Act of 1992. And, geographic information systems (GIS) have evolved with information technology, database technology, display technology, and advances in communications' technologies.

According to the International Space Business Council Remote Sensing/GIS Revenues for the period 1998-2002 are estimated at \$9.8 billion. GPS revenues for the same period are estimated at \$26.6 billion for a total of \$36.4 billion for the spatial technologies industry.

With the growth of the commercial spatial technologies industry, enabled by commercial technology breakthroughs, the availability of public sector assets such as the Global Positioning System's constellation of 24 Department of Defense satellites, and the authority granted to commercial U.S. companies to deploy half meter resolution satellite imaging systems, the industry is developing rapidly to meet growing market needs.

The question then is: what is the NSDI role and its relationship to the public sector in the evolution of the commercial spatial technologies industry; and what is the private sector's role in developing the NSDI.

2.2 It's The Data, Not the Process

Early on, it was recognized that data to support the evolution of geographical information systems (GIS) accounted for as much as 80% to 90% of the cost of developing and deploying geospatial technologies for decision support. It was no surprise that spatial databases were expensive to create and, equally, if not more so, to maintain.

The Federal sector, championed by the Mapping Sciences Committee, recognized in the early 1990's the value of coordinating spatial data development and usage. The realization that significant benefits, and cost savings, could accrue from a national effort to address the need to coordinate and share spatial data lead to the Executive Order that directed the FGDC to develop the National Spatial Data Infrastructure (NSDI).

Notwithstanding the authorities vested in the FGDC by Executive Order 12906 and the OMB Circular A-16 to coordinate federal spatial data programs and to champion the development of the NSDI, numerous federal programs function independently of the NSDI. Programs championed by federal agencies to meet defined agency mission requirements, including U.S. Bureau of Census, TIGER; National Highway Performance Network, National Hydrology Survey, HUD's Community 20/20 proceed concurrently with the NSDI's data objectives. For the NSDI to succeed in the eyes of the private sector, these overlapping and seemingly competing activities need to be harmonized into a common, complementary Federal effort.

One of the core elements of the NSDI was the identification of the seven major framework layers. This effort focused on the need to develop a common national

spatial data set to facilitate production and use of geographic data to meet national needs by providing a reliable, standardized source for commonly needed and used geographic data themes.

While much has been accomplished to develop these framework layers – the National Digital Orthophoto Program (NDOP) is an example with over 90% of the country complete with 7.5' quadrangles, other data layers are lacking leading to the criticism that much of the FGDC's effort has been focused on process at the expense of building useful framework data sets.

2.3 Public Sector Expectations of the Private Sector

From a recommendation by the National Performance Review completed in 1993, President Clinton, in 1994, directed the Executive Branch of the Federal government to develop, in cooperation with state, local, tribal governments, and the private sector, a coordinated national spatial data infrastructure.

The Executive Branch was directed by President Clinton to develop the NSDI in cooperation with the private sector to support public and private sector applications dependent on geospatial data in such areas as transportation, community development, agriculture, emergency response, environmental management, and information technology.

Since the NSDI's inception, private sector consultation and advice has been sought to aid in the development and implementation of the objectives of the President's order.

During the same period, a pronounced growth occurred in private sector digital mapping and data collection, creating for the first time a healthy private sector mapping business community. While the private sector was addressing end-user needs in the marketplace, the expectations of the NSDI program for the private sector spatial technologies industry, as expressed in the National Performance Review, were unrealistic in terms of financial contribution and were not articulated clearly as to what was meant by private sector cooperation.

In the Fall of 1999, the Spatial Technologies Industry Association (STIA) proposed to the FGDC to examine the level of private sector cooperation in the development of the NSDI. It was generally perceived at that time, that the level of private sector participation, as envisioned in the National Performance Review (NPR) and President Clinton's Executive Order directing the development of the NSDI, had not been realized. The Framework Data Survey conducted by the National States Geographic Information Council (NSGIC), in conjunction with the FGDC, confirmed private industry's low level of data sharing and participation in data sharing activities. Furthermore, private sector participation in NSDI events

including the 1999 GeoData Policy Forum held in Washington, D.C. did not meet organizer's expectations.

As a private sector trade association, STIA was interested in exploring why private industry was reluctant to participate in the development of the NSDI. Was it because of lack of awareness of the program? Was it due to a lack of understanding of the benefits that would accrue to private sector participating companies? Was it perceived competition between private and public sector mapping concerns? Was it due to unrealistic expectations for the private sector? Or was it due to other factors such as a lack of industry input into the NSDI process or the differences between private and public sector drivers?

For working purposes of this report, "private sector" is defined as two separate types – producers and users:

- 1) Producers of geospatial data, solutions and software providers, such as GIS software companies, data providers, and GIS consultants, GPS, and remote sensing providers, etc.
- 2) End-users of geospatial technology such as telecommunications companies, utilities, insurance companies, transportation services, agriculture, emergency management, and the like.

From a purely marketing perspective, it is our contention that to address the issue of private sector participation in the NSDI, we need to consider evolving market dynamics – producers and users – and to understand the private sector drivers of participation. Who are the potential participants? What industry sectors are most inclined to participate, and in what capacity? We then need to consider the NSDI in the context of the private sector.

In this Phase I Project and Report, we have examined 1) the expectations of the Executive Branch for private sector participation in the NSDI, 2) economic and business factors that drive private sector business decisions, and 3) actions to consider to increase private sector awareness and participation in the NSDI.

The STIA believes that the NSDI is a critical national enabler that can contribute to significant economic expansion over the next decade. A robust and successful NSDI, focused on the needs of both the public and private sectors, could contribute to economic expansion. For these reasons, the STIA is pleased to be able to contribute to a discussion of this important national program.

In summary, the drivers of private sector participation, the conclusions and recommendations put forth in this report are:

Drivers of Private Sector Participation in the NSDI

- ***Private sector participation in the NSDI must consider firms private sector drivers***
- ***Economic: increased revenues and profits; decreased costs***
- ***Competitive Advantage: uniqueness, security, and privacy***
- ***Time-to-market: completeness, availability, ease of use***
- ***Quality: accuracy and completeness***
- ***Cultural: Expectations of geospatial providers and end-users***

Conclusions

- ***NSDI must address private sector interests and accommodate the private sector's role***
- ***NSDI must complement the private sector's activities***
- ***NSDI lacks a business plan focused on action not process***
- ***Multiple NSDI and NSDI related activities at the Federal level confuse the private sector marketplace***
- ***Knowledge of NSDI offerings and advantages to the private sector are lacking***
- ***The NSDI must address demand factors in the marketplace – both public sector and private sector***
- ***Security and availability of information needs to be improved***
- ***NSDI must address scale and accuracy of data***

Recommendations

- ***Redefine the NSDI articulating public sector responsibilities and the private sector's role***
- ***Evaluate the existing NSDI framework program and develop a plan for building and maintaining the framework layers***
- ***Examine OMB oversight role to ensure federal programs sponsored by federal agencies do not overlap with the NSDI initiative***
- ***FGDC needs to better understand private sector needs and how the public and private sectors can become complementary***
- ***FGDC should refocus its efforts on coordinating federal spatial data activities with expanded liaison with the private sector***
- ***Convene a private sector advisory group to tackle the higher level issues outlined in section 12.3***
- ***Seek private sector consultations and input on NSDI initiatives such as the GeoData Alliance, Aurora Partnership, and the I Teams Initiative***

Recommendations (Cont'd)

- ***Develop outreach to private sector targeted toward specific industry sectors***
- ***Establish a NSDI Private Sector Advocate***
- ***Build and maintain a database of companies that make up the spatial technologies industry and end-user community to better understand their needs from the NSDI***
- ***Use this database for marketing activities designed to increase awareness and participation***